Dynamic CO-CIN report to SAGE and NERVTAG (Recent cases)

Dynamic content updated: 2020-10-15 04:31:14.
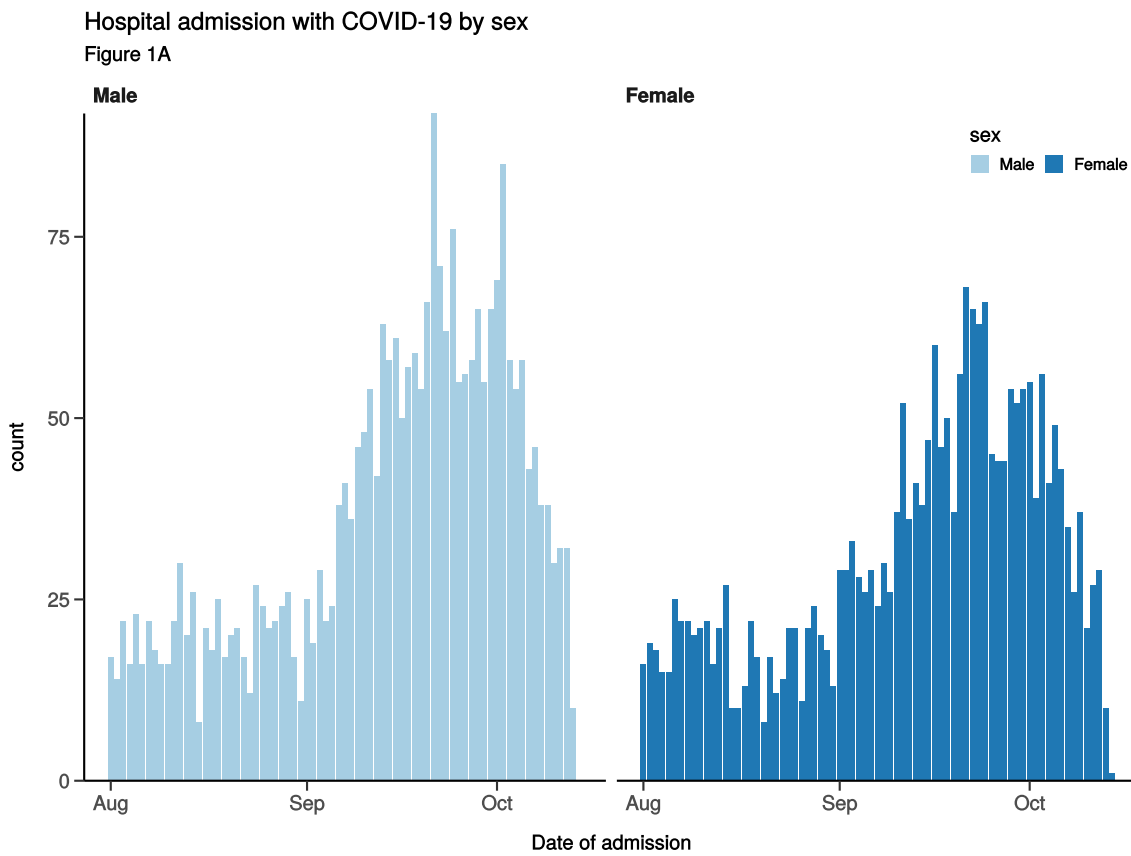
Executive summary

Includes patients admitted after 01 August 2020

There are 5108 patients included in CO-CIN. Of these, 534 patient(s) have died and 600 required ICU. 2562 have been discharged home.
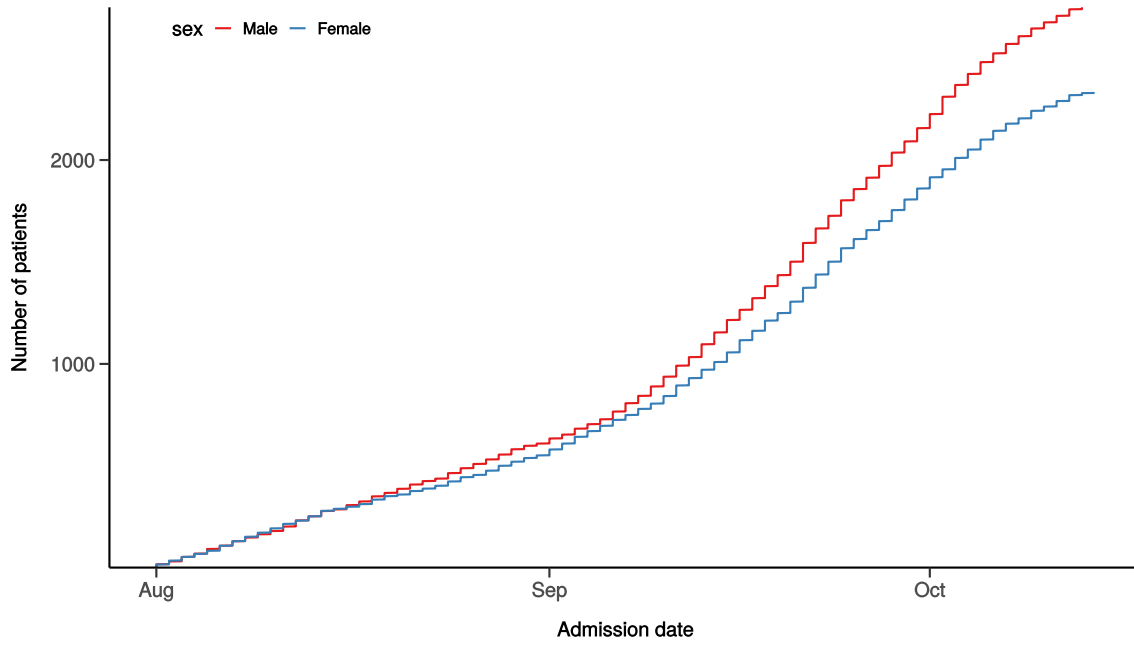
Admission

Figure 1

Hospital admission with COVID-19 by sex
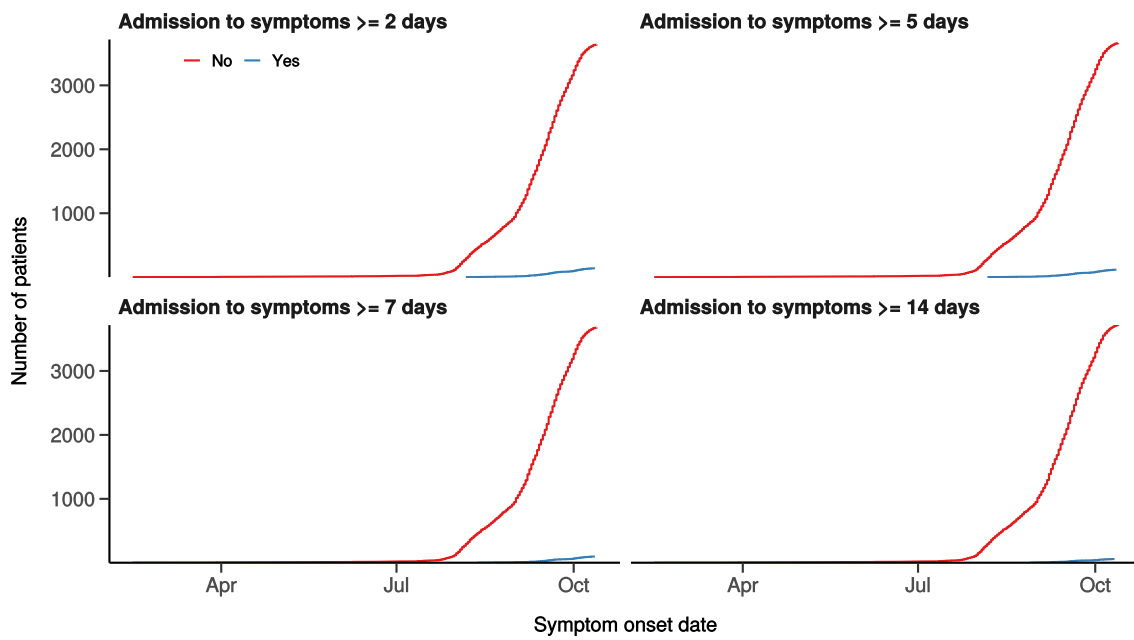Figure 1A

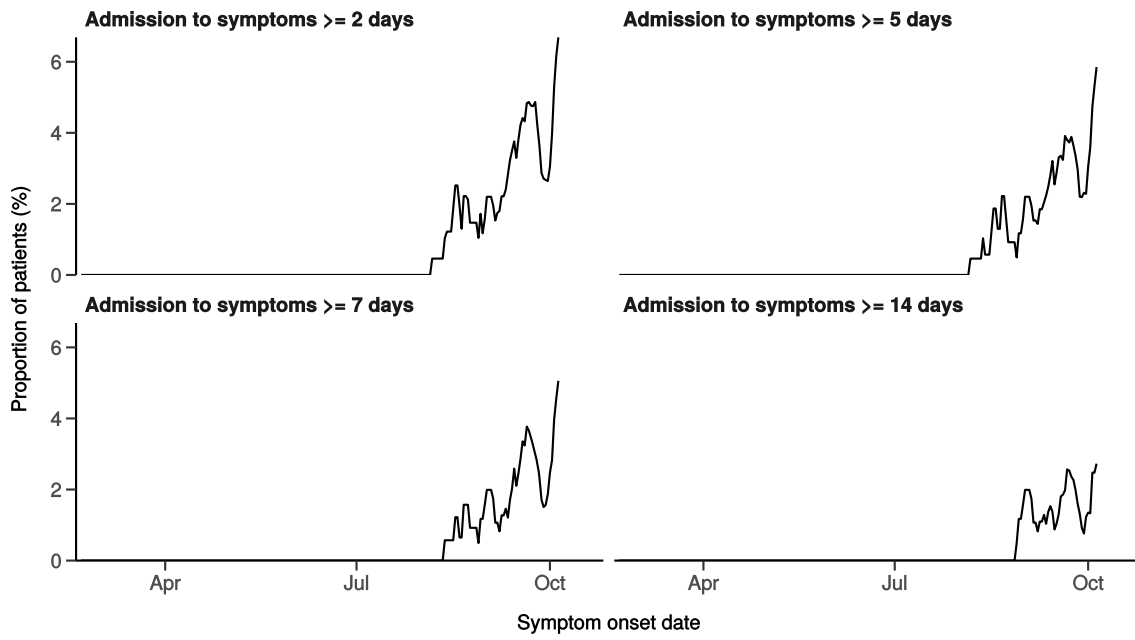## Hospital admission with COVID-19 by sex
Figure 1B

Number with symptom onset occuring after admission to hospital
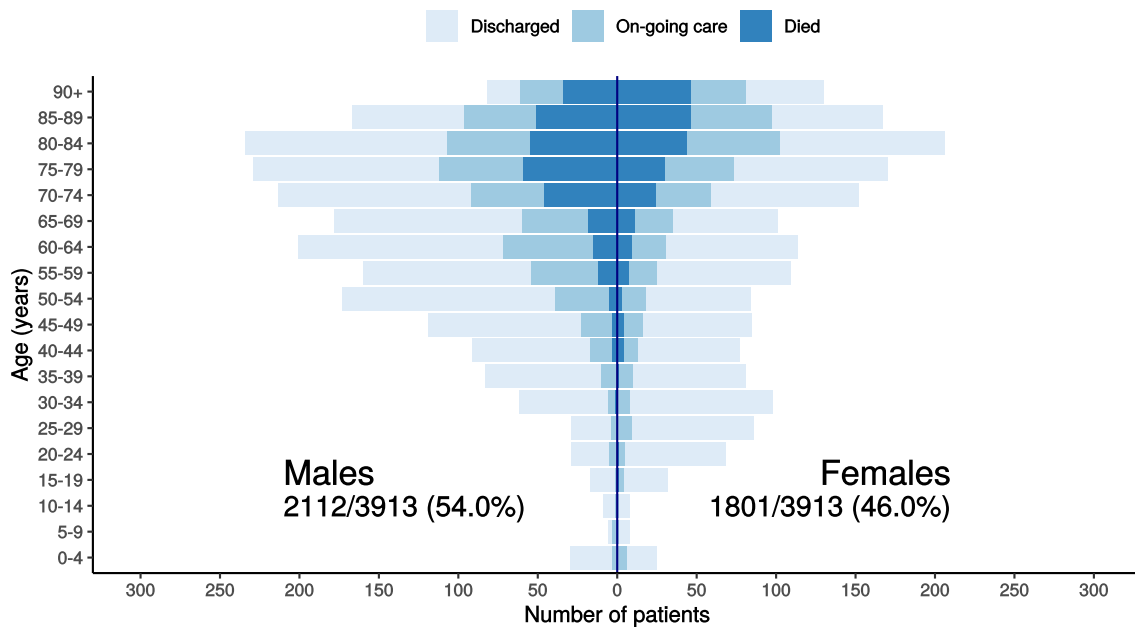Figure 1C

Proportion with symptom onset occuring after hospital admission
Figure 1D - 7-day rolling percentage. n = 3776
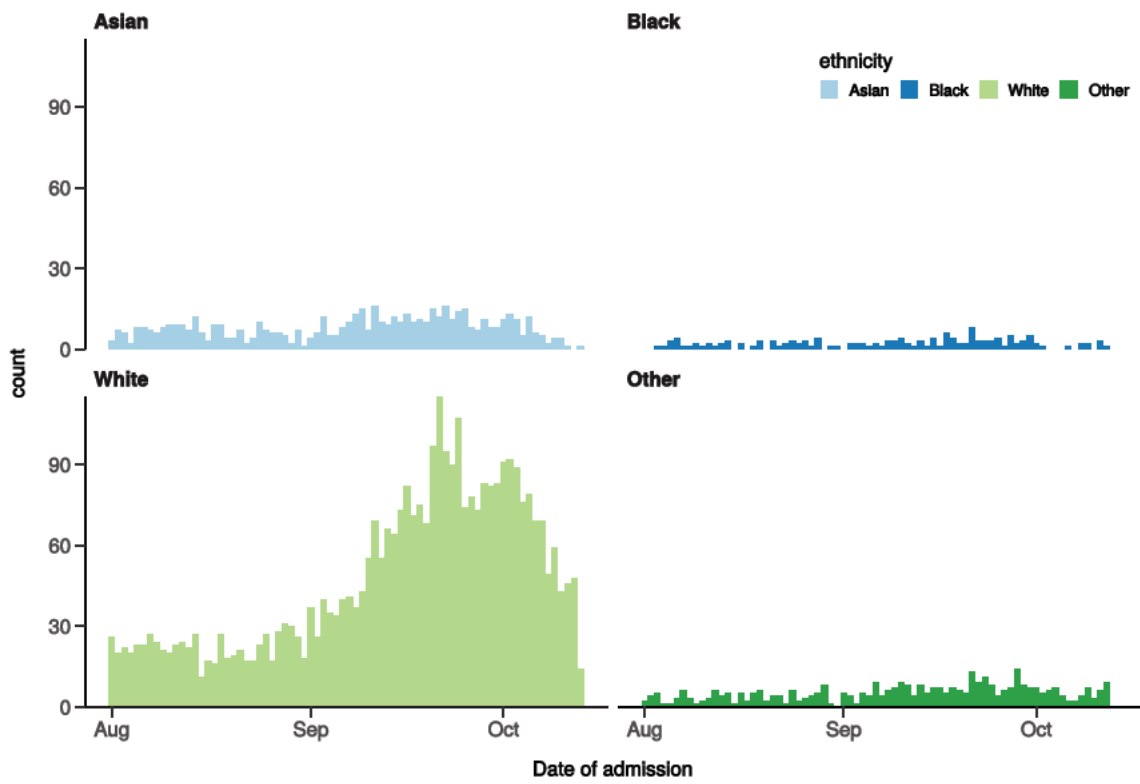

Patients with outcome stratified by age, and sex
Figure 1E

Hospital admission with COVID-19 by ethnicity

Figure 1F

Location by CCG / Healthboard

Figure 2

Click and drag on map to zoom into area. Reset via toolbar at top of map.

n = 5101
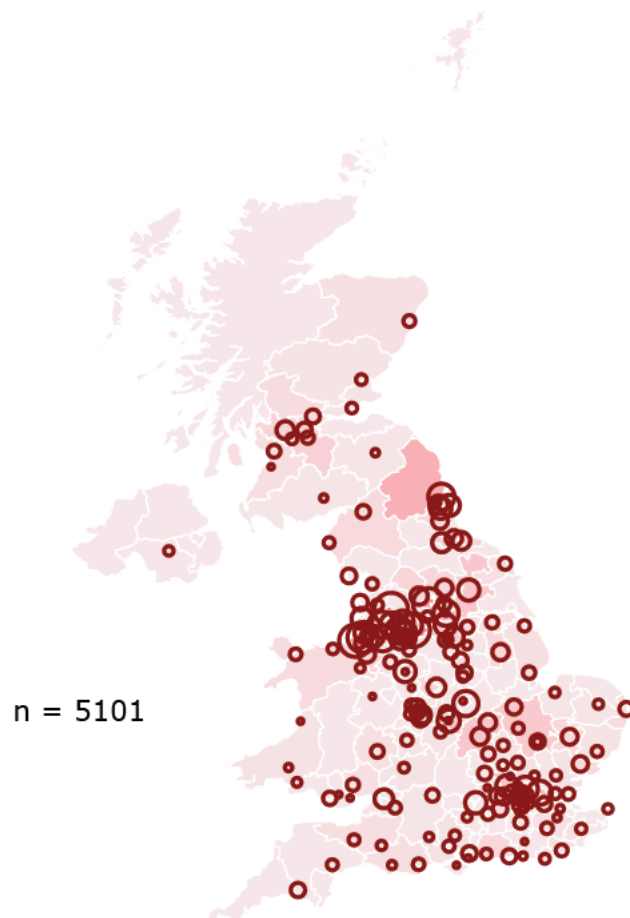
Symptoms and comorbidity

Figure 3A

Symptoms on presentation to hospital (% patients, n = 4515)
Figure 3A

Comorbidity (% patients, n = 5108)
Figure 3B

Figure 3B - Symptoms by Age
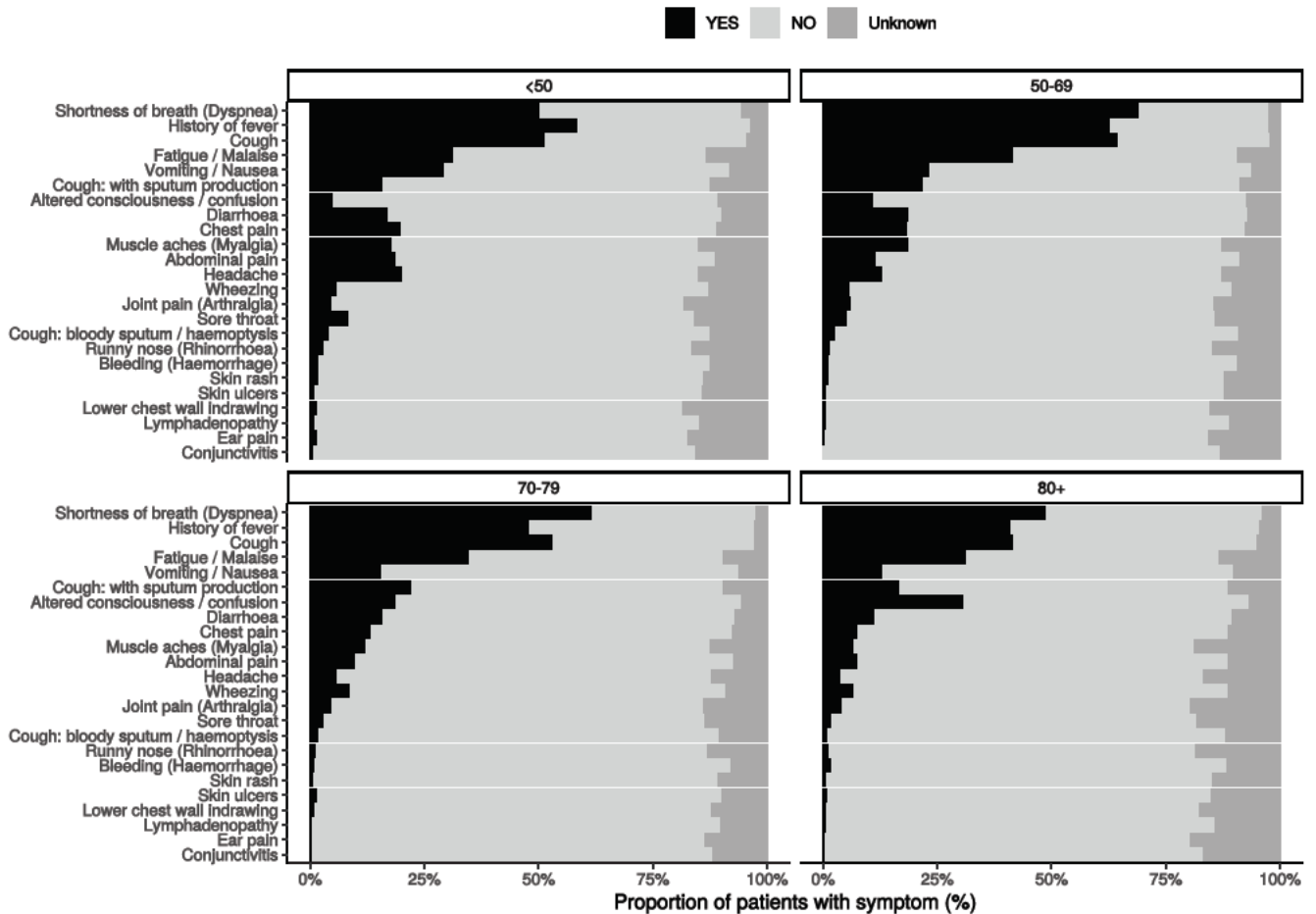
Age Group	Number of Patients included in Symptoms Plot
<50	1139

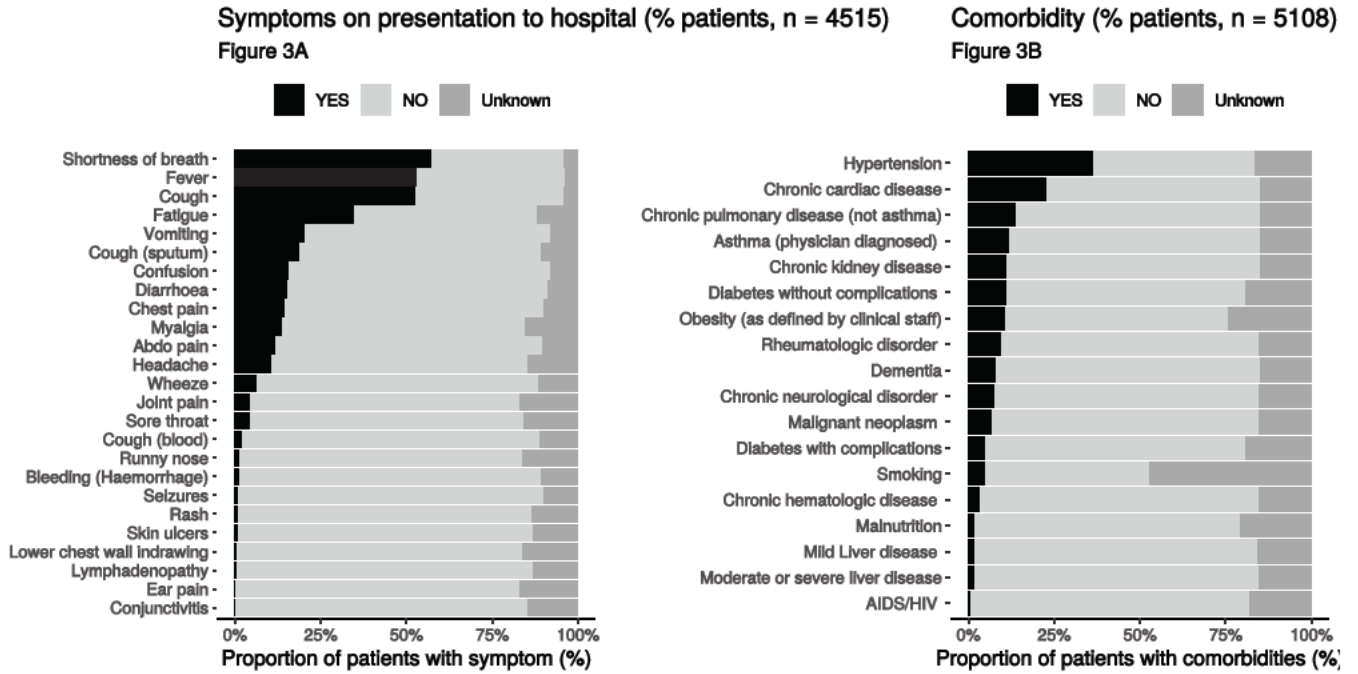| Age Group	Number of Patients included in Symptoms Plot
50-69	1340
70-79	919
80+	1176

Figure 3C

Correlation of symtpoms in all pages. Note clusters, top right to bottom left, flu-like, coryzal, abdominal, respiratory, neurocutaneous.
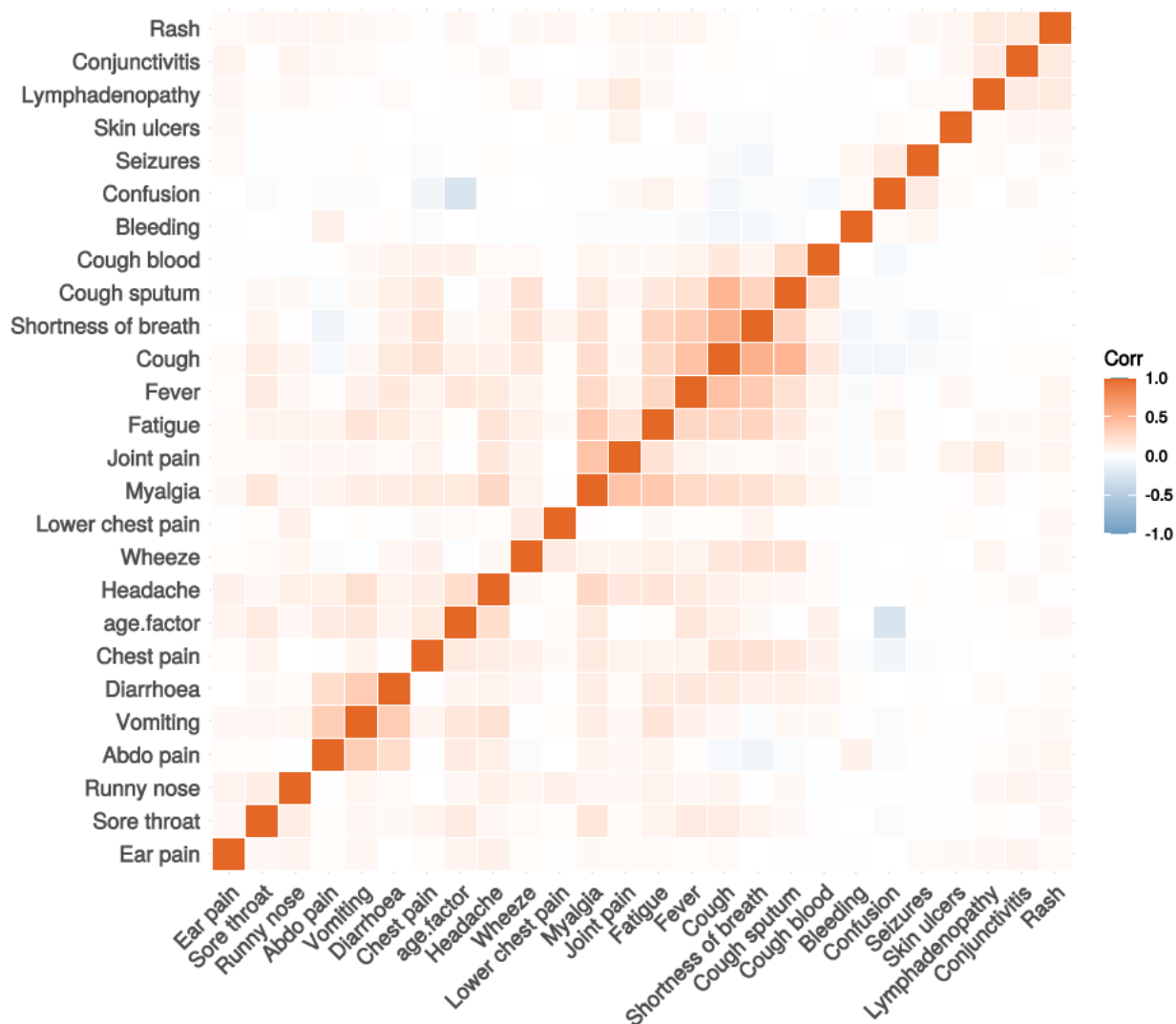
Symptoms (diagnostic criteria)

Figure 4A

n = 4515

- ○ Fever
- ○ Cough
- ○ Shortness of breath
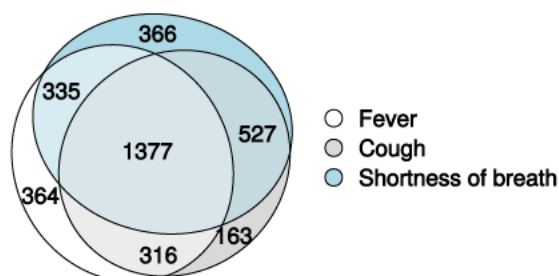
Symptoms (most common)

Figure 4B

n = 4515

Shortness of breath (Dyspnea)
History of fever
Cough
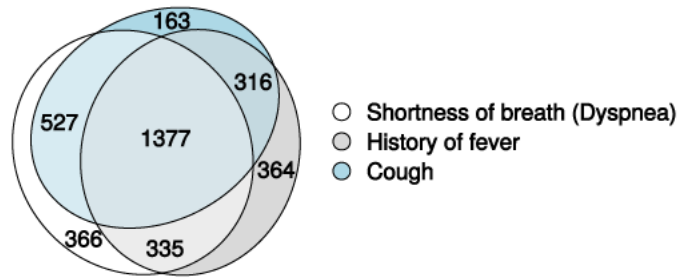
Comorbidity (most common)

Figure 4C

n = 5108

Hypertension
Chronic cardiac disease
Chronic pulmonary disease (not asthma)
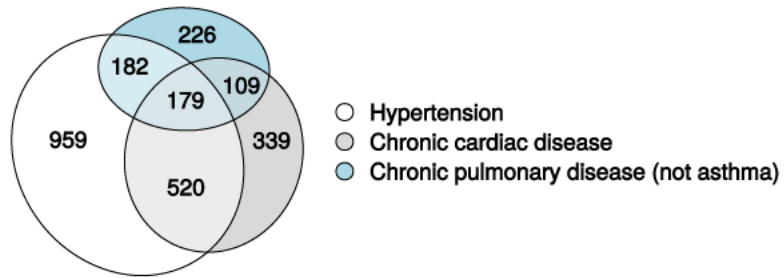
Medication prior to illness

Figure 5

Number of medications prior to admission
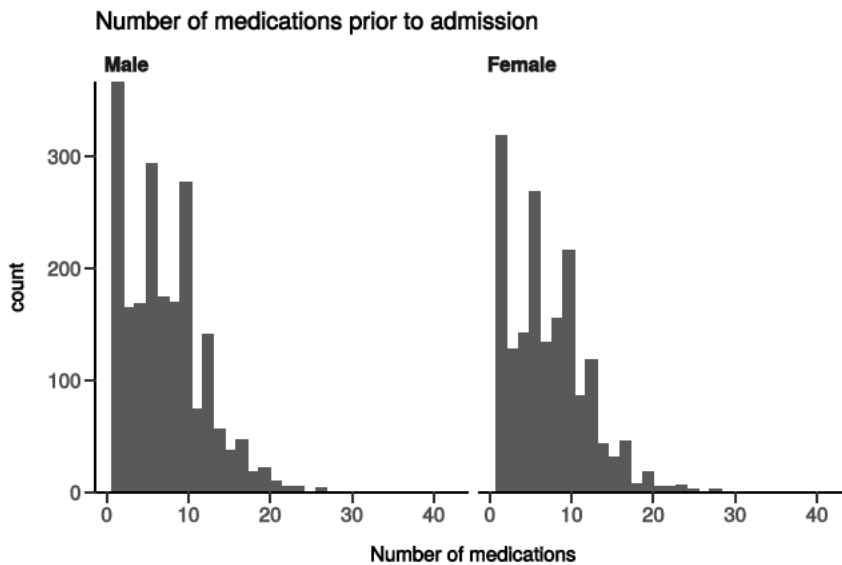
Preadmission treatment

Figure 6

Pre-admission treatment

Anti-infectives for illness episode (left) immunosuppressants including oral (not i
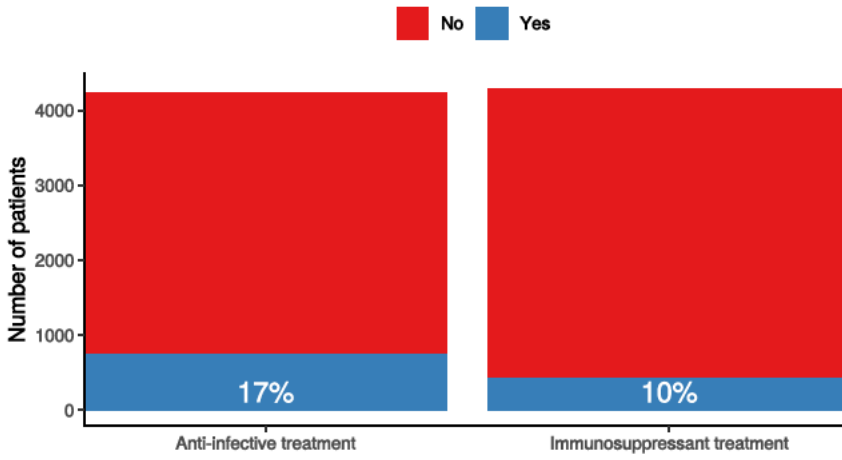
Patient flow

Figure 7A - All patients

N = 4596
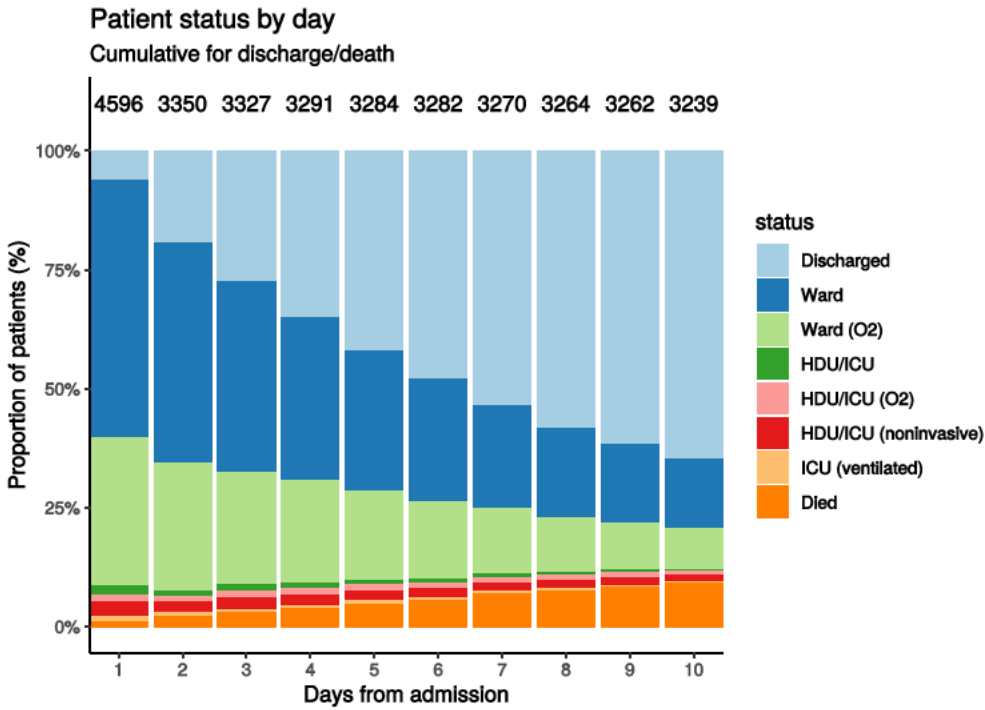
Figure 7B - Patients admitted >=14 days and <=28 days ago

N = 1538

Patient status by day
Cumulative for discharge/death
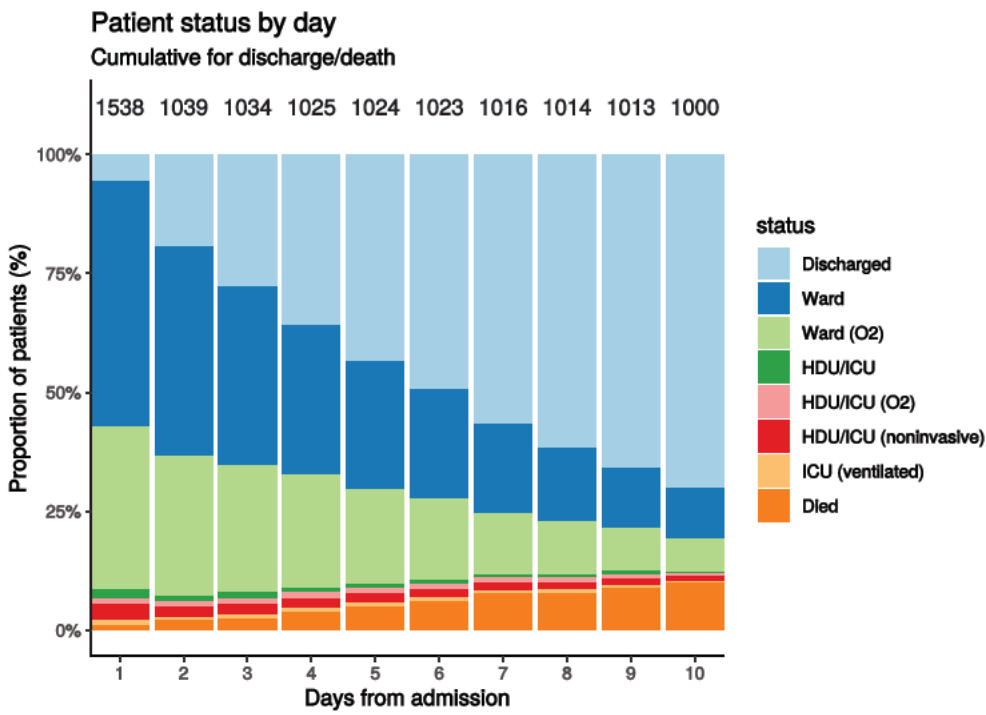
Oxygen requirement

Figure 8A - All patients

N = 4374
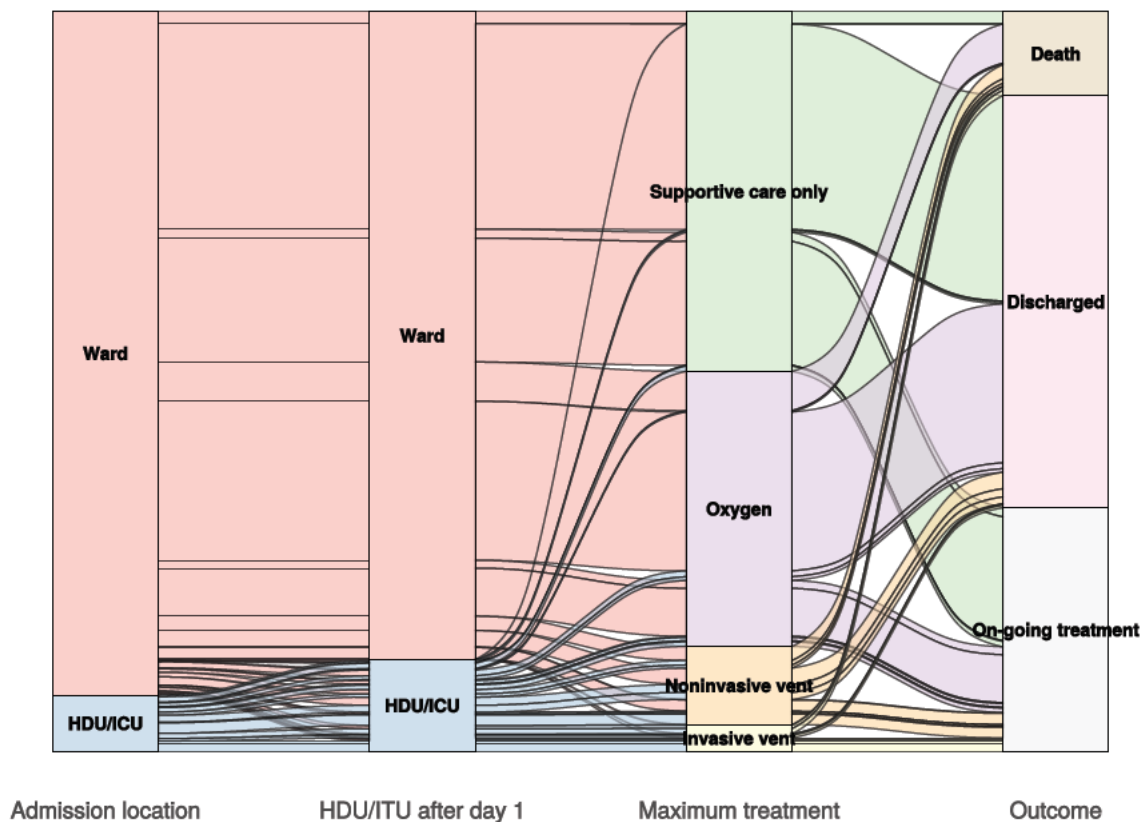
Figure 8B - Patients admitted >=14 days and <=28 days ago

N = 1472

In-hospital medical treatment

Figure 9

In-hospital treatment

Anti-virals, antibiotics, corticosteroids,
and anti-fungals for patients who have completed journey.
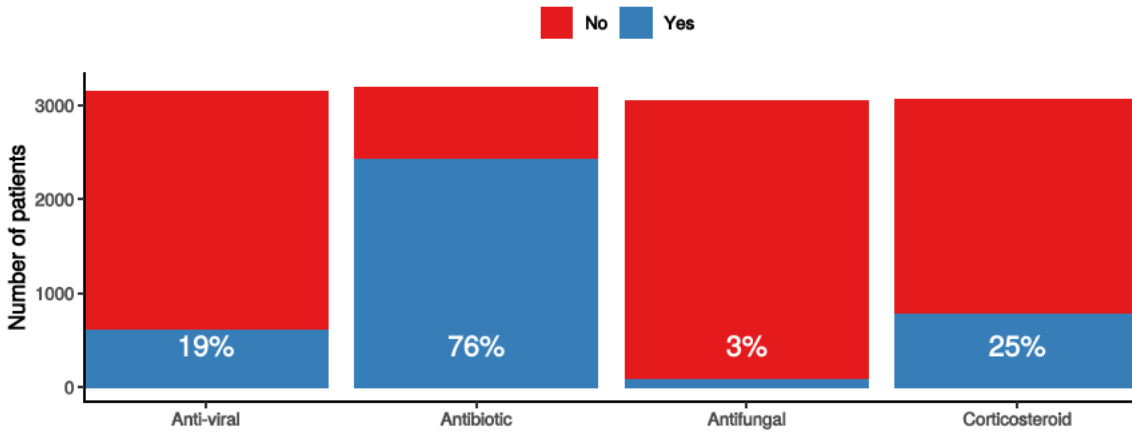
Treatment

Figure 10

ICU/HDU admission
Figure 10A
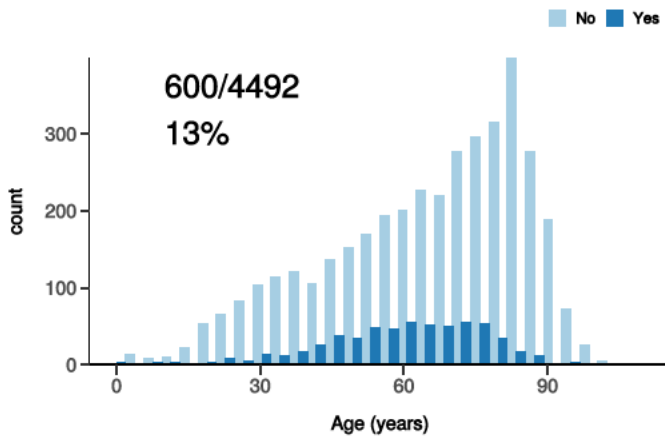
High flow oxygen
Figure 10B
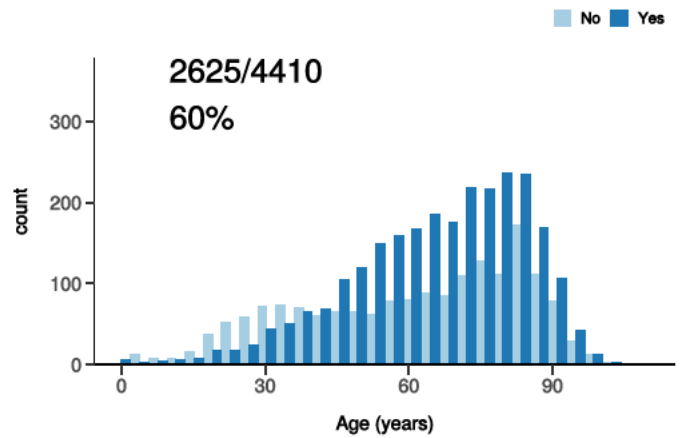
Noninvasive ventilation
Figure 10C
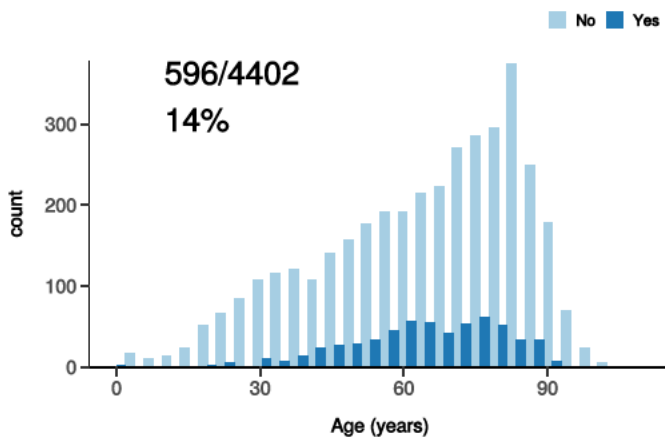
Invasive ventilation
Figure 10D
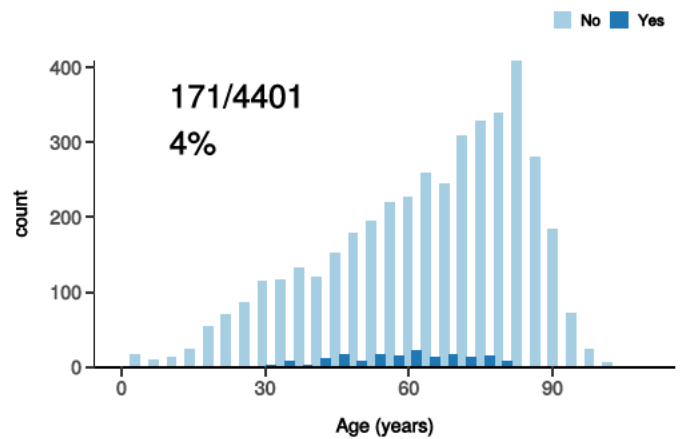
Status in patients admitted >=14 days from today

Figure 11

All: status in patients admitted >=14 days ago

Figure 11A

Died	On-going care	Discharged alive
503/3412	565/3412	2341/3412
15%	17%	69%
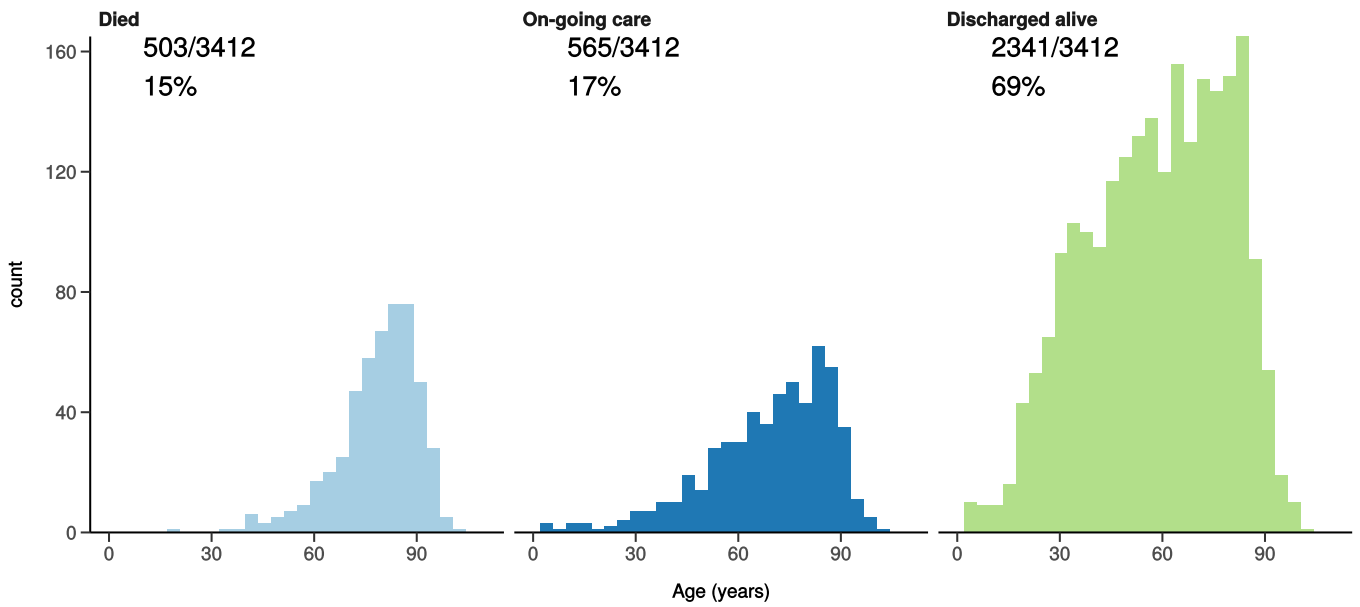
ICU/HDU admissions: status in patients admitted >=14 days ago

Figure 11B

Died	On-going care	Discharged alive
109/426	134/426	183/426
26%	31%	43%
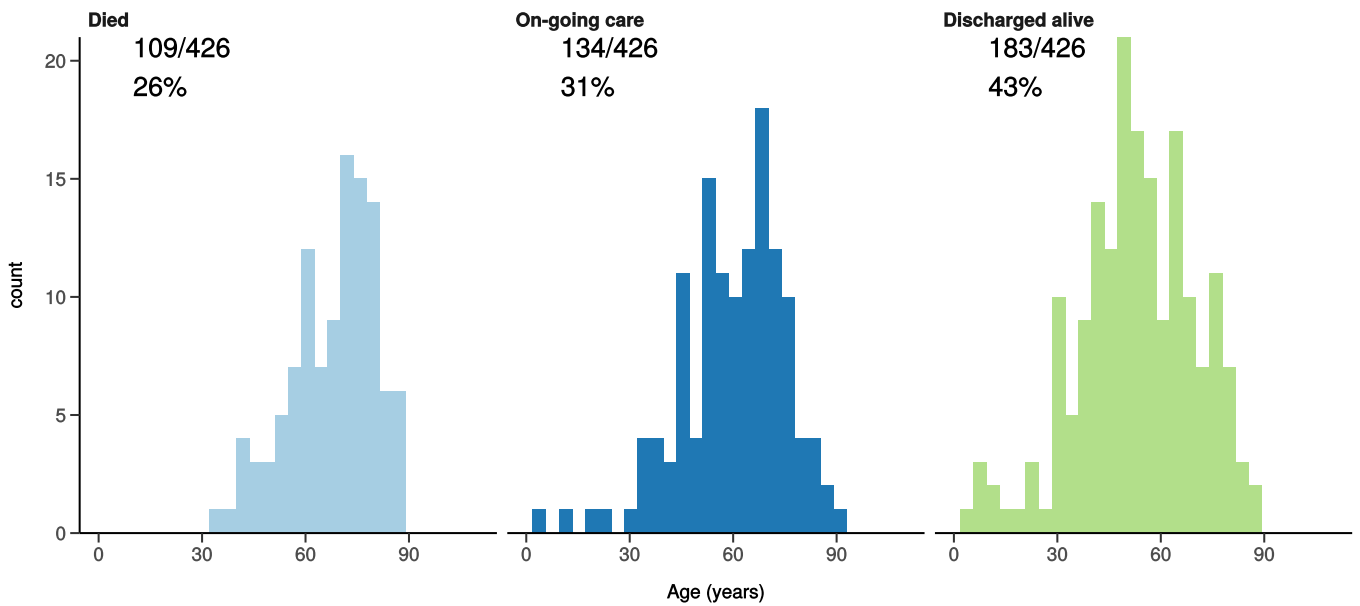
Invasive ventilation: status in patients admitted >=14 days ago

Figure 11c

Died	On-going care	Discharged alive
52/122	47/122	23/122
43%	39%	19%
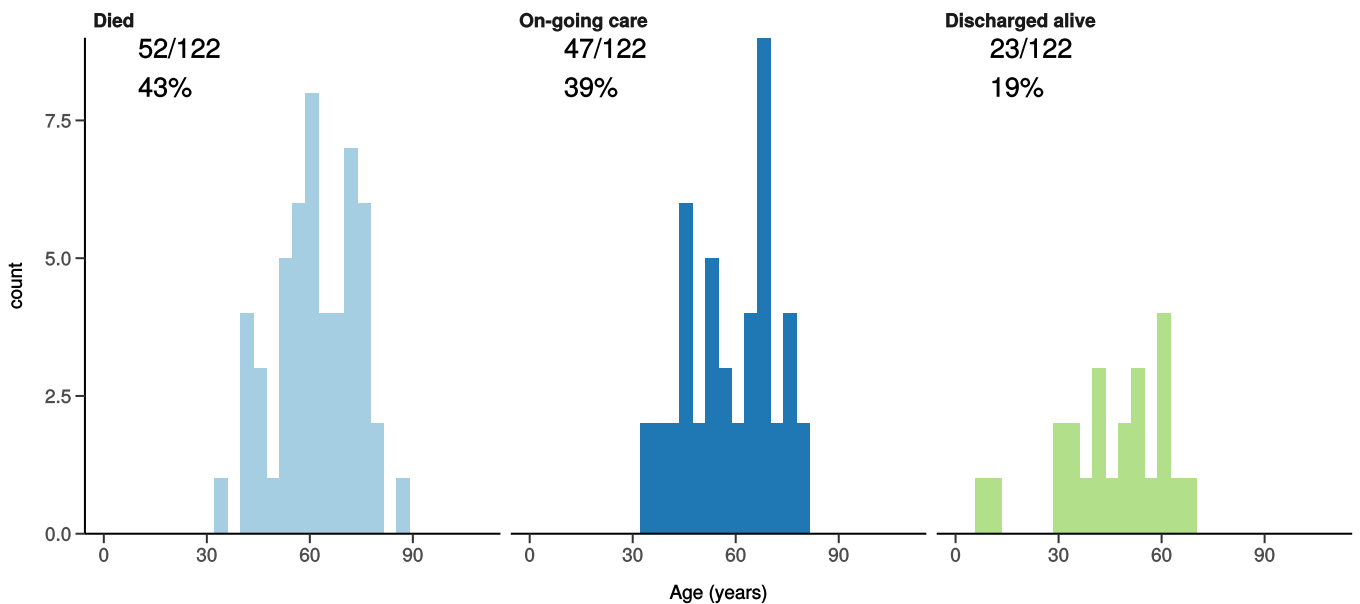
Length of stay stratified by age

Figure 12

Length of stay stratified by age and mortality
Proportion who reach outcome by day 14 shown
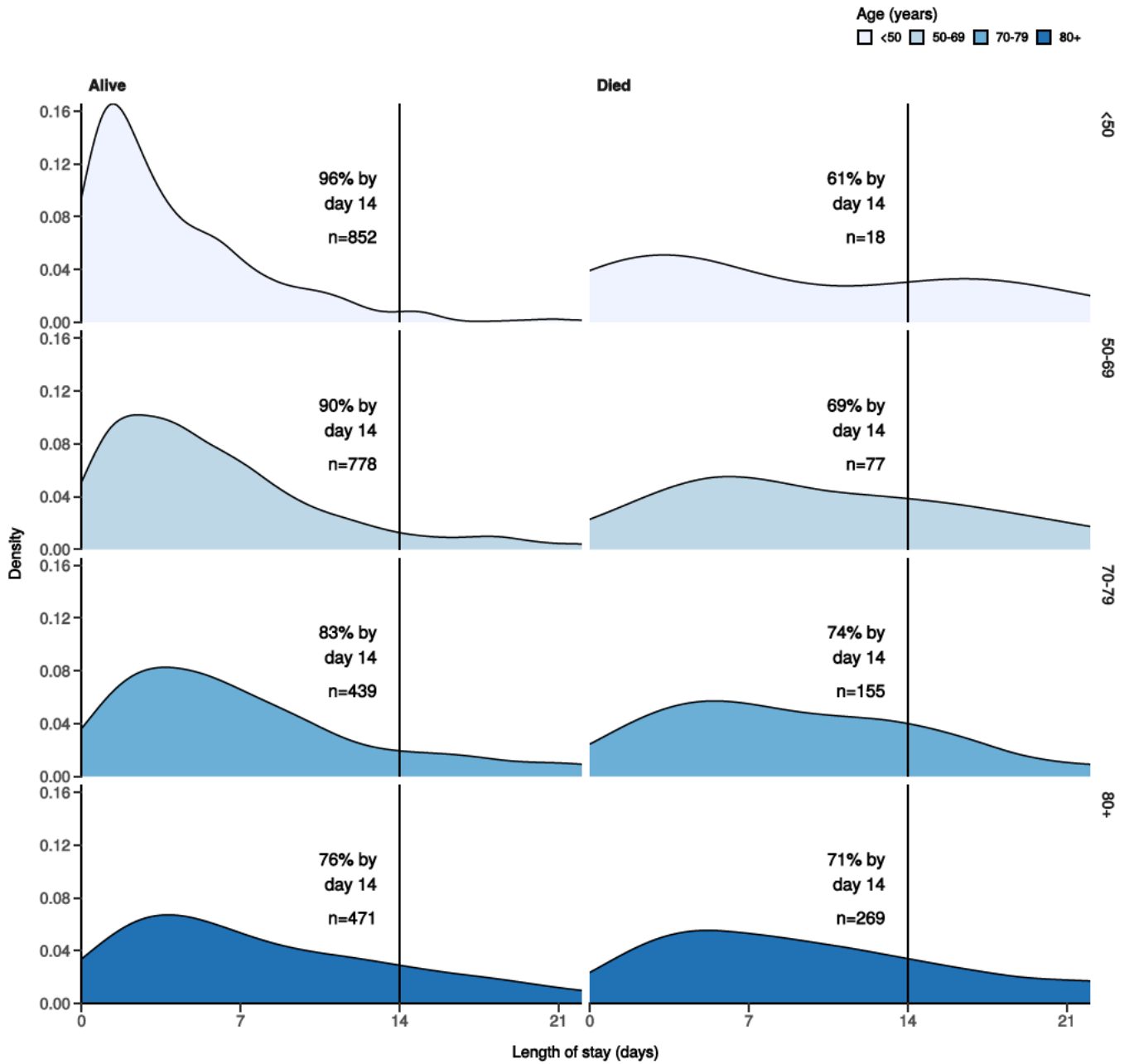
Predictors of death: logistic regression multivariable model

Logistic regression model only includes patients admitted >14 days ago from today.

Dependent: death		No	Yes	OR (univariable)	OR (multivariable)
Age on admission (years)	<50	852 (98.2)	16 (1.8)	•	•
	50-69	746 (90.8)	76 (9.2)	5.42 (3.22-9.71, p<0.001)	4.79 (2.68-9.22, p<0.001)
	70-79	425 (73.8)	151 (26.2)	18.92 (11.51-33.32, p<0.001)	13.72 (7.74-26.28, p<0.001)
	80+	457 (63.8)	259 (36.2)	30.18 (18.58-52.67, p<0.001)	18.64 (10.52-35.73, p<0.001)
Sex at Birth	Male	1303 (82.2)	282 (17.8)	•	•

Dependent: death		No	Yes	OR (univariable)	OR (multivariable)
	Female	1178 (84.3)	220 (15.7)	0.86 (0.71-1.05, p=0.135)	0.96 (0.75-1.22, p=0.736)
	Not specified	0 (NaN)	0 (NaN)	•	•
Chronic cardiac disease	NO	1809 (87.9)	249 (12.1)	•	•
	YES	476 (68.5)	219 (31.5)	3.34 (2.72-4.11, p<0.001)	1.55 (1.20-2.01, p=0.001)
Chronic pulmonary disease (not asthma)	NO	2003 (85.7)	334 (14.3)	•	•
	YES	278 (68.0)	131 (32.0)	2.83 (2.22-3.58, p<0.001)	1.42 (1.06-1.89, p=0.017)
Chronic neurological disorder	NO	2097 (84.1)	397 (15.9)	•	•
	YES	184 (73.6)	66 (26.4)	1.89 (1.39-2.55, p<0.001)	1.36 (0.94-1.96, p=0.098)
Chronic hematologic disease	NO	2205 (83.6)	434 (16.4)	•	•
	YES	73 (72.3)	28 (27.7)	1.95 (1.23-3.01, p=0.003)	1.28 (0.70-2.25, p=0.411)
Chronic kidney disease	NO	2053 (85.4)	350 (14.6)	•	•
	YES	231 (66.6)	116 (33.4)	2.95 (2.29-3.78, p<0.001)	1.29 (0.94-1.77, p=0.109)
Dementia	NO	2146 (85.4)	368 (14.6)	•	•
	YES	150 (62.8)	89 (37.2)	3.46 (2.60-4.59, p<0.001)	1.56 (1.08-2.24, p=0.018)
Obesity (as defined by clinical staff)	NO	1720 (82.5)	364 (17.5)	•	•
	YES	288 (87.3)	42 (12.7)	0.69 (0.48-0.96, p=0.033)	1.00 (0.66-1.48, p=0.990)
Malignant neoplasm	NO	2145 (84.7)	387 (15.3)	•	•
	YES	130 (63.4)	75 (36.6)	3.20 (2.35-4.32, p<0.001)	2.40 (1.65-3.46, p<0.001)

Number in dataframe = 4140, Number in model = 2335, Missing = 1805, AIC = 1711.3, C-statistic = 0.809, H&L = Chi-sq(8) 26.17 (p=0.001)

Figure 13 - Adjusted odds ratio plot

Death

Age on admission (years)	<50	-	
	50-69	4.79 (2.68-9.22, p<0.001)	
	70-79	13.72 (7.74-26.28, p<0.001)	
	80+	18.64 (10.52-35.73, p<0.001)	
Sex at Birth	Male	-	
	Female	0.96 (0.75-1.22, p=0.736)	
	Not specified	-	
Chronic cardiac disease	YES	1.55 (1.20-2.01, p=0.001)	
Chronic pulmonary disease (not asthma)	YES	1.42 (1.06-1.89, p=0.017)	
Chronic neurological disorder	YES	1.36 (0.94-1.96, p=0.098)	
Chronic hematologic disease	YES	1.28 (0.70-2.25, p=0.411)	
Chronic kidney disease	YES	1.29 (0.94-1.77, p=0.109)	
Dementia	YES	1.56 (1.08-2.24, p=0.018)	
Obesity (as defined by clinical staff)	YES	1.00 (0.66-1.48, p=0.990)	
Malignant neoplasm	YES	2.40 (1.65-3.46, p<0.001)	

Odds ratio (95% CI, log scale)
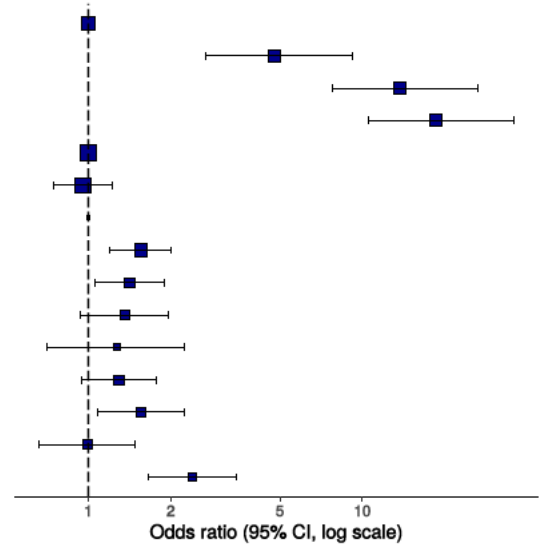
Figure 14 - ROC
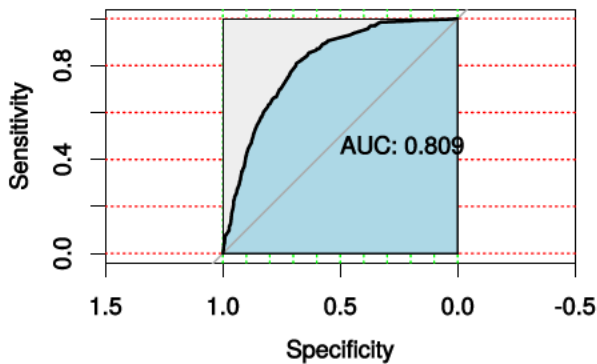
Survival models

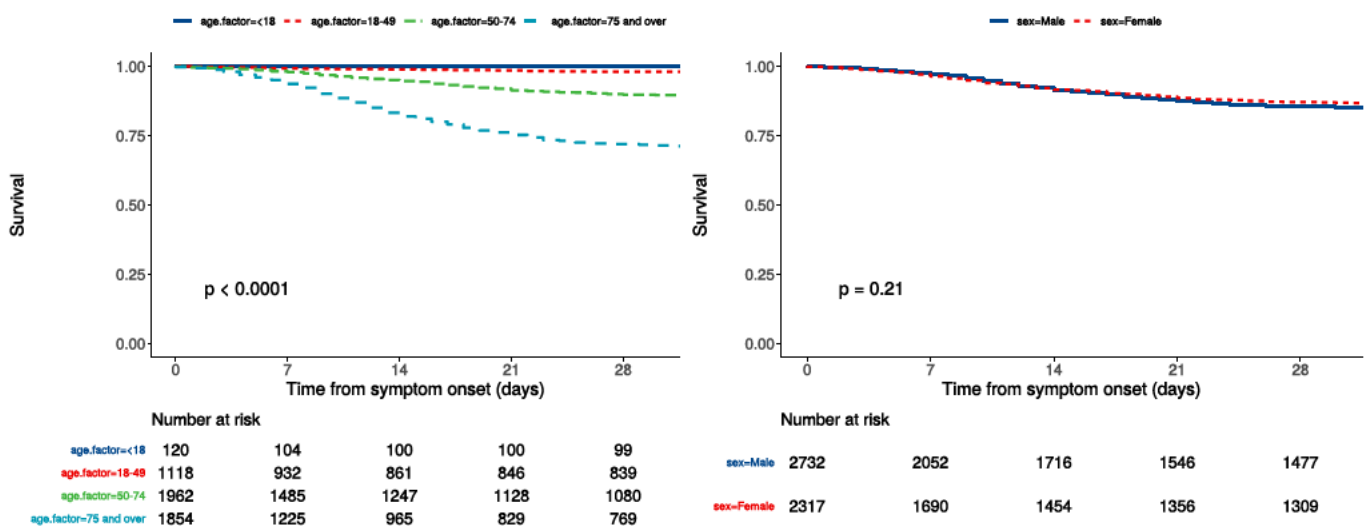### Kaplan-Meier plots for survival from symptom onset stratified by age (left) and sex (right)

Figure 15

P-value is log-rank test.

Cox proportional hazards model

The methodology for this is now up and running, but models are still being explored. **What is presented here is not a final model, but to demonstrate methodology.** The results are correct, but important variables have not yet been included.

Time from symptom onset.

Dependent: Surv(time, status)		all	HR (univariable)	HR (multivariable)
Age on admission (years)	<50	1238 (24.5)	•	•
	50-69	1470 (29.1)	4.72 (2.80-7.96, p<0.001)	4.19 (2.24-7.83, p<0.001)
	70-79	1030 (20.4)	15.04 (9.12-24.81, p<0.001)	11.99 (6.56-21.92, p<0.001)
	80+	1319 (26.1)	23.37 (14.32-38.14, p<0.001)	16.52 (9.02-30.25, p<0.001)
Sex at Birth	Male	2732 (54.1)	•	•
	Female	2317 (45.9)	0.90 (0.75-1.06, p=0.207)	1.01 (0.82-1.25, p=0.906)
qSOFA score on admission	0	2003 (49.9)	•	•
	1	1708 (42.5)	2.17 (1.75-2.68, p<0.001)	2.32 (1.83-2.94, p<0.001)
	2	286 (7.1)	5.82 (4.44-7.62, p<0.001)	4.04 (2.95-5.53, p<0.001)
	3	18 (0.4)	13.88 (6.80-28.34, p<0.001)	12.63 (5.43-29.37, p<0.001)
Symptomatic at presentation	No symptoms	466 (10.2)	•	•
	Symptoms	4094 (89.8)	1.33 (0.97-1.84, p=0.077)	•
Chronic cardiac disease	NO	3200 (73.7)	•	•
	YES	1143 (26.3)	3.00 (2.51-3.57, p<0.001)	1.41 (1.14-1.75, p=0.002)
Chronic kidney disease	NO	3774 (87.1)	•	•
	YES	561 (12.9)	2.63 (2.15-3.23, p<0.001)	1.27 (0.99-1.64, p=0.063)
Moderate or severe liver disease	NO	4235 (98.3)	•	•
	YES	75 (1.7)	1.64 (0.92-2.91, p=0.091)	1.57 (0.77-3.19, p=0.217)
Chronic neurological disorder	NO	3933 (91.1)	•	•
	YES	384 (8.9)	1.77 (1.36-2.29, p<0.001)	•
Malignant neoplasm	NO	3979 (92.2)	•	•
	YES	337 (7.8)	2.79 (2.19-3.55, p<0.001)	2.00 (1.52-2.64, p<0.001)
Chronic hematologic disease	NO	4164 (96.5)	•	•
	YES	150 (3.5)	1.83 (1.26-2.66, p=0.002)	•
Obesity (as defined by clinical staff)	NO	3325 (86.3)	•	•
	YES	529 (13.7)	0.66 (0.48-0.91, p=0.011)	0.88 (0.61-1.26, p=0.489)
Diabetes without complications	NO	3576 (86.7)	•	•
	YES	547 (13.3)	1.39 (1.09-1.78, p=0.008)	•
Rheumatologic disorder	NO	3829 (88.8)	•	•
	YES	483 (11.2)	1.54 (1.21-1.96, p<0.001)	•

Dependent: Surv(time, status)		all		HR (univariable)		HR (multivariable)
Dementia	NO	3932 (90.8)	•		•	
	YES	397 (9.2)		2.99 (2.38-3.76, p<0.001)		1.16 (0.87-1.55, p=0.311)
Malnutrition	NO	3959 (97.9)	•		•	
	YES	84 (2.1)		1.65 (0.98-2.76, p=0.057)	•	
smoking_mhyn_2levels	NO	2439 (54.7)	•		•	
	YES	238 (5.3)		0.80 (0.51-1.27, p=0.348)	•	
	N/K	1784 (40.0)		1.44 (1.20-1.72, p<0.001)	•	

Number in dataframe = 5076, Number in model = 3291, Missing = 1785, Number of events = 377, Concordance = 0.810 (SE = 0.010), R-squared = 0.138(Max possible = 0.831), Likelihood ratio test = 488.751 (df = 13, p = 0.000)

Figure 16a - Multivariable Cox proportional hazards model

Survival: HR (95% CI, p-value)

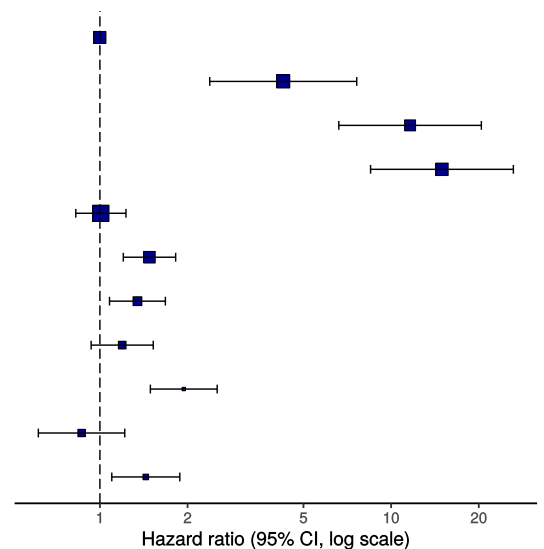|		
Age on admission (years)	<50	-
	50-69	4.19 (2.24-7.83, p<0.001)
	70-79	11.99 (6.56-21.92, p<0.001)
	80+	16.52 (9.02-30.25, p<0.001)
Sex at Birth	Female	1.01 (0.82-1.25, p=0.906)
qSOFA score on admission	0	-
	1	2.32 (1.83-2.94, p<0.001)
	2	4.04 (2.95-5.53, p<0.001)
	3	12.63 (5.43-29.37, p<0.001)
Chronic cardiac disease	YES	1.41 (1.14-1.75, p=0.002)
Chronic kidney disease	YES	1.27 (0.99-1.64, p=0.063)
Moderate or severe liver disease	YES	1.57 (0.77-3.19, p=0.217)
Malignant neoplasm	YES	2.00 (1.52-2.64, p<0.001)
Obesity (as defined by clinical staff)	YES	0.88 (0.61-1.26, p=0.489)
Dementia	YES	1.16 (0.87-1.55, p=0.311)
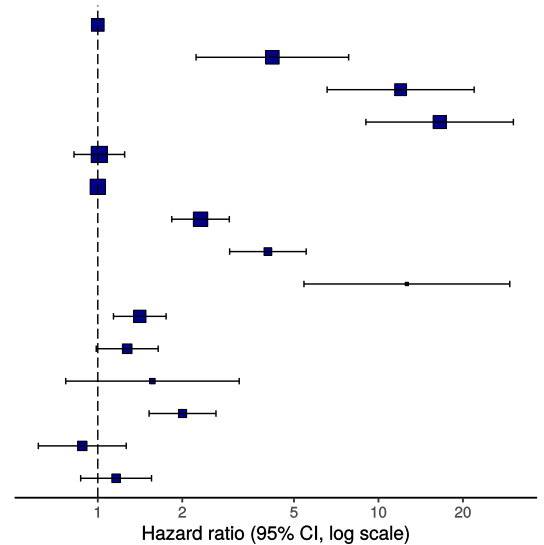
Figure 16b - Multivariable Cox proportional hazards model (age, sex, comorbidities only)

Survival: HR (95% CI, p-value)

Age on admission (years)	<50	-
	50-69	4.26 (2.38-7.62, p<0.001)
	70-79	11.62 (6.61-20.41, p<0.001)
	80+	14.95 (8.50-26.29, p<0.001)
Sex at Birth	Female	1.01 (0.83-1.23, p=0.939)
Chronic cardiac disease	YES	1.48 (1.20-1.82, p<0.001)
Chronic pulmonary disease (not asthma)	YES	1.35 (1.08-1.68, p=0.008)
Chronic kidney disease	YES	1.19 (0.93-1.52, p=0.160)
Malignant neoplasm	YES	1.94 (1.49-2.53, p<0.001)
Obesity (as defined by clinical staff)	YES	0.86 (0.61-1.22, p=0.405)
Dementia	YES	1.44 (1.10-1.88, p=0.008)

ROC = 0.8103909

Figure 17 - Predictions calibration plot

Black: observed Gray: ideal
Blue : optimism corrected

Predicted 7 Day Survival B=40 based on observed-predicted
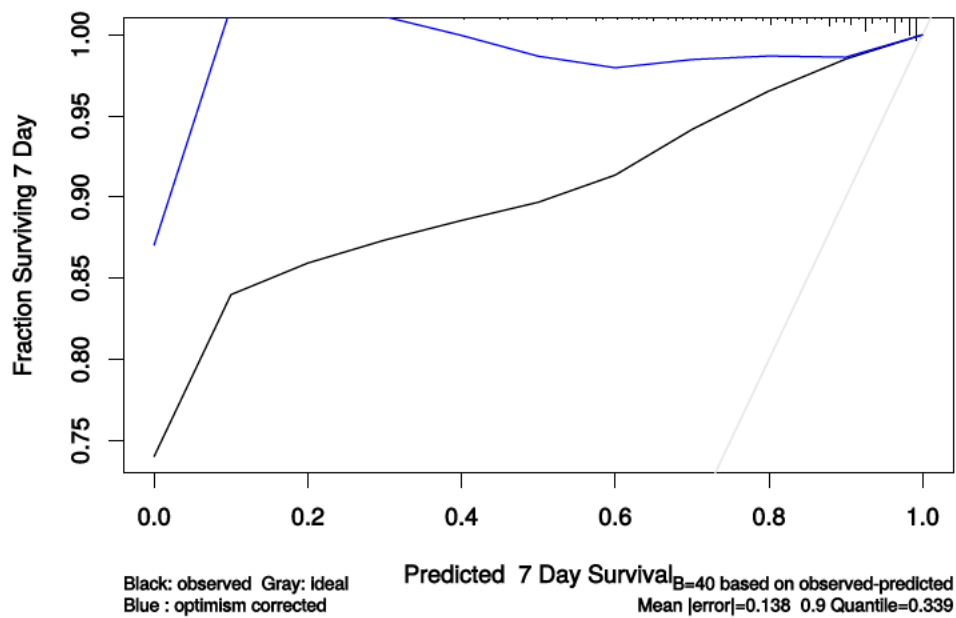Mean |error|=0.138 0.9 Quantile=0.339

Figure 18 - Prognostic model predictions

Again, for demonstration of methods.

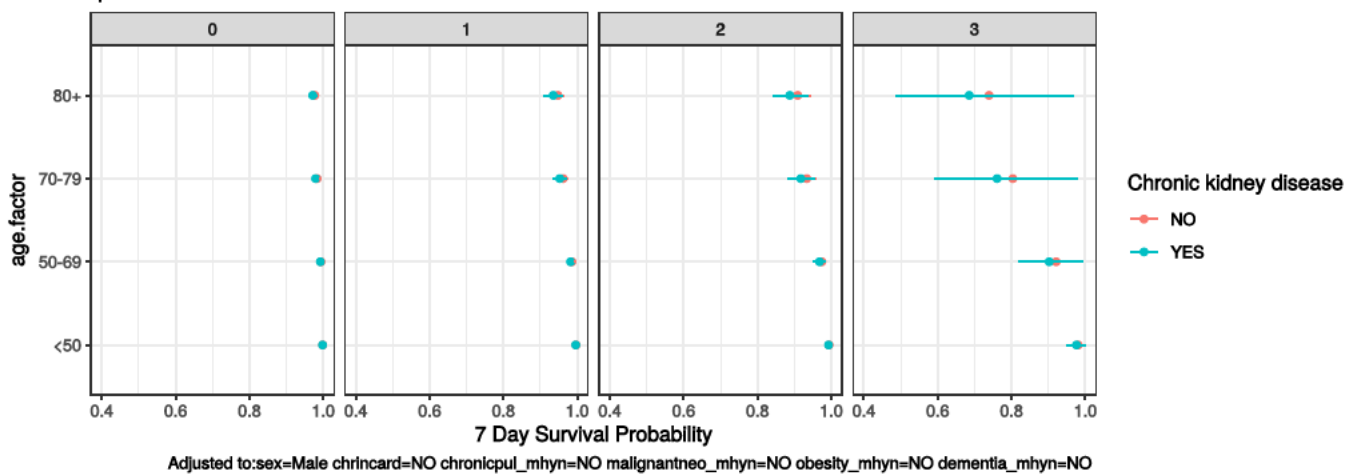Prognostic model for survival 7 days after onset

qSOFA score on admission

Adjusted to:sex=Male chrincard=NO chronicpul_mhyn=NO malignantneo_mhyn=NO obesity_mhyn=NO dementia_mhyn=NO

Figure 19 - Death by severity (NEWS) on admission

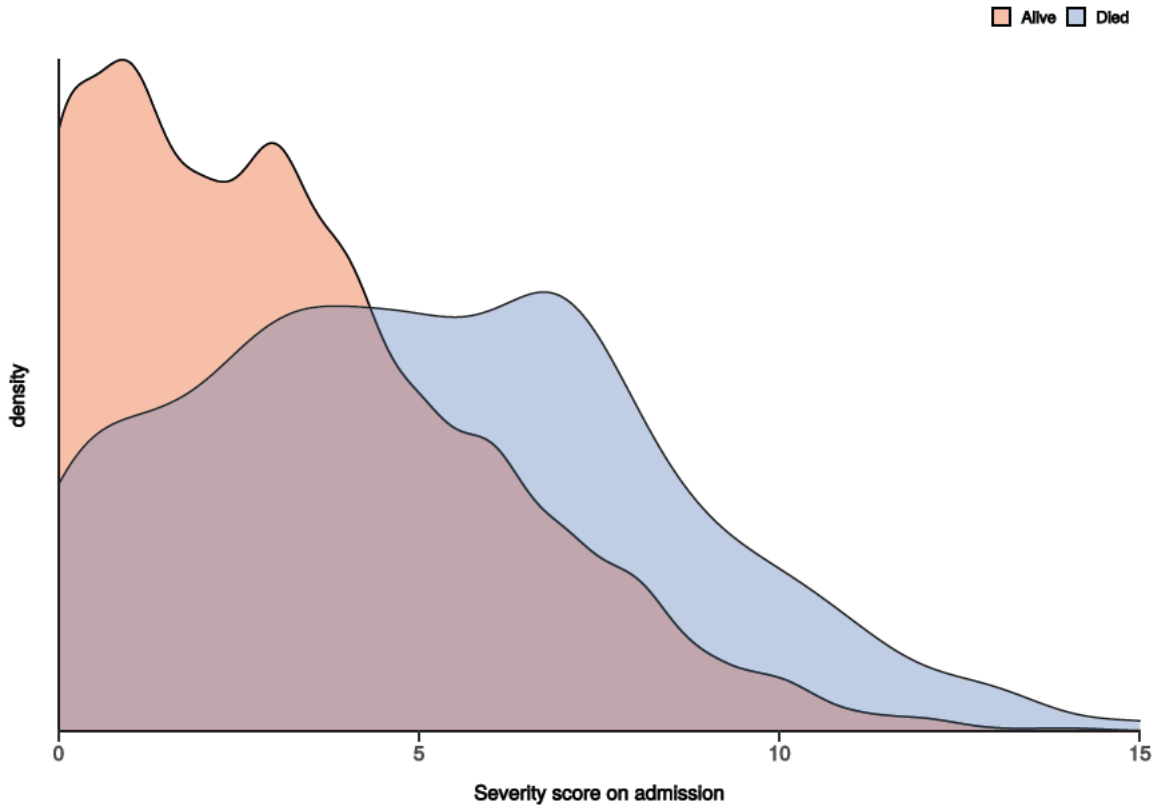## Number of deaths by NEWS score at admission

Figure 20 - Death by severity (NEWS) on admission stratified by age

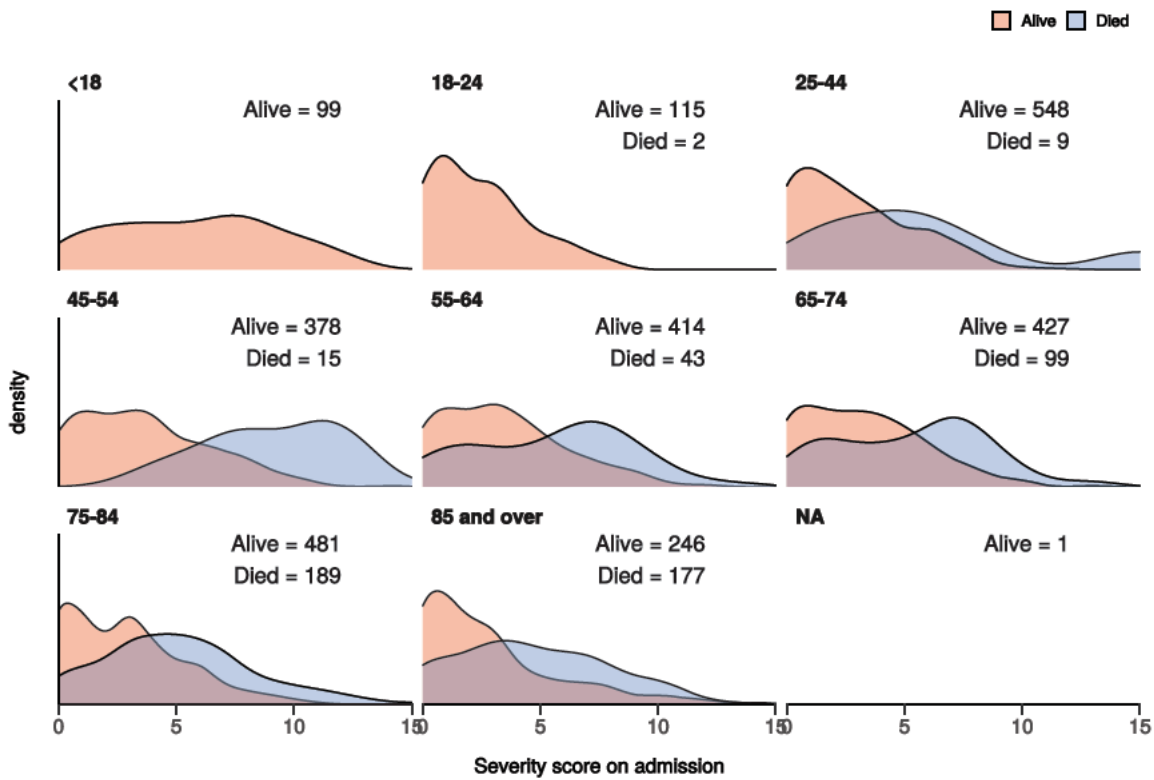## Number of deaths by NEWS score at admission
Stratified by age

Figure 21 - Death by severity (qSOFA) on admission stratified by age